HRV Vertical Unit Ventilators

Classroom Ventilators with Energy Recovery

Installation, Operation and Maintenance Instructions Manual

VENMAR CES
Dedicated Outdoor Air Solutions

Capacity: Up to 1,400 cfm
Model: HRV450w, HRV1000w

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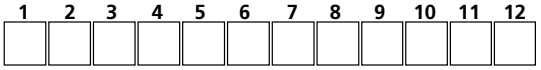
Manufacturer reserves the right to discontinue or change specifications or designs without notice or obligation.

Nomenclature

HRV450w Nomenclature (300–800 cfm)



1. FROST CONTROL
D – Recirc defrost[1]
N – Non-defrost

2. VOLTAGE
A – 120/1/60[2]
B – 208/120/1/60[3]
C – 230/120/1/60[3]

3. ENERGY RECOVERY
P – Poly core
A – Aluminum core

4. HEATING
E – Electric heat
H – Hot water[2]
P – Proportional electric heat[4]
X – No heat[2]

5. HEATING CAPACITY
0 – No heat[5]
1 – 2.5 kW (one-stage)[6]
2 – 5.0 kW (one-stage)[6]
3 – 5.0 kW (two-stage)[6]
4 – 7.5 kW (two-stage)[6]
5 – 10.0 kW (two-stage)[6]
6 – 25,000 Btu[7]
7 – 50,000 Btu[7]

6. COOLING
D – Dx cooling
R – Fixed recirculation option
X – No cooling

7. CONTROLS
T – Thermostat
X – No thermostat

8. SUPPLY DISCHARGE
T – Top plenum, no grille
G – Top plenum, c/w grille
D – Top plenun, c/w double deflection grille
X – No top plenum

9. OUTSIDE AIR DAMPER
1 – Insulated motorized
2 – Insulated spring return
3 – No damper

10. EXHAUST AIR DAMPER
1 – Motorized
2 – Spring return
3 – No damper

11. EXTERNAL DISCONNECT
N – Non-fused disconnect switch[8]
X – No disconnect switch

12. BOTTOM BASE
B – Bottom base, no grille
G – Bottom base, c/w grille
X – No bottom base

Notes:
1 When ordering recirc defrost, you must order outside air and exhaust air dampers.
2 Hot water and no heat options available in 120 VAC option only.
3 Requires a neutral wire with L1 and L2.
4 Must select a two-stage heating capacity option; first stage is proportional and second stage is fixed.
5 Only available with no heat.
6 Only available with electric heat.
7 Only available with hot water heating.
8 Non-fused disconnect switch is field installed (remote mounted).

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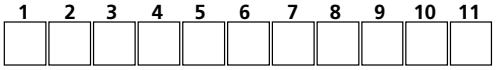
HRV1000w Nomenclature (400–1,400 cfm)



1. FROST CONTROL
D – Recirc defrost[1]
N – Non-defrost

2. VOLTAGE
A – 120/1/60[2]
B – 208/120/1/60[3]
C – 230/120/1/60[3]

3. ENERGY RECOVERY
P – Poly core
A – Aluminum core

4. HEATING
E – Electric heat
H – Hot water
P – Proportional electric heat[4]
X – No heat

5. HEATING CAPACITY
0 – No heat[5]
1 – 2.5 kW (one-stage)[6]
2 – 5.0 kW (one-stage)[6]
3 – 5.0 kW (two-stage)[6]
4 – 7.5 kW (two-stage)[6]
5 – 10.0 kW (two-stage)[6]
6 – 12.5 kW (two-stage)[6]
7 – 15.0 kW (two-stage)[6]
8 – 50,000 Btu[7]
9 – 70,000 Btu[7]

6. COOLING
D – Dx cooling
X – No cooling

7. CONTROLS
T – Thermostat
X – No thermostat

8. SUPPLY DISCHARGE
T – Top plenum, no grille
G – Top plenum, c/w grille
D – Top plenun, c/w double deflection grille
S – Silencer plenum c/w double deflection grille[8]
X – No top plenum

9. OUTSIDE AIR DAMPER
1 – Insulated motorized
2 – Insulated spring return
3 – No damper

10. EXHAUST AIR DAMPER
1 – Motorized
2 – Spring return
3 – No damper

11. EXTERNAL DISCONNECT
N – Non-fused disconnect switch[9]
X – No disconnect switch

Notes:
1 When ordering recirc defrost, you must order outside air and exhaust air dampers.
2 Hot water and no heat options available in 120 VAC option only.
3 Requires a neutral wire with L1 and L2.
4 Must select a two-stage heating capacity option; first stage is proportional and second stage is fixed.
5 Only available with no heat.
6 Only available with electric heat.
7 Only available with hot water heating.
8 Silencer plenum option is not available with Dx cooling option.
9 Non-fused disconnect switch is field installed (remote mounted).

Safety Considerations

Warning, Caution and Important notes appear throughout this manual in specific and appropriate locations to alert Installing Contractors, maintenance or service personnel of potential safety hazards, possible equipment damage or to alert personnel of special procedures or instructions that must be followed as outlined below.

⚠ WARNING

Identifies an instruction which, if not followed, might cause serious personal injuries including possibility of death.

CAUTION

Identifies an instruction which, if not followed, might severely damage the unit, its components, the assembly or final installation.

IMPORTANT

Indicates supplementary information needed to fully complete an instruction or installation.

Hazards may exist within this equipment because it contains electrical and powerful moving components. Only qualified service personnel should install or service this equipment. Untrained personnel can perform basic maintenance such as maintaining filters. Observe precautions marked in literature and on labels attached to unit. Follow all safety codes.

⚠ WARNING

Disconnect the main power switch to the unit before performing service or maintenance. Electric shock can cause personal injury or death.

Specifications

The HRV Vertical Unit Ventilator series is one of the successful solutions to ventilation and indoor air quality problems from Venmar CES. This series consists of commercial heat and energy recovery ventilators with heating and/or cooling. Designed as appliances, they are ideally suited as complete classroom ventilators. With an upright configuration and small footprint, they require a minimum amount of space for installation. An optional top supply plenum allows for flexibility to suit various installations. The cabinet is well insulated and tightly sealed to provide quiet operation.

Case

- 0.04" [1 mm] pre-finished steel
- Heavy gauge pre-finished steel
- Smooth texture
- Bone white finish

Unit Dimensions

- HRV450w – See Figure A1.
- HRV1000w – See Figure A3.

Coil Dimension Drawings

- HRV450w – See Figure A2.
- HRV1000w – See Figure A4.

Supply and Exhaust Airflow

- See Appendix B.

Heat Recovery Module

- Polypropylene plate – standard.
- Aluminum plate – optional.
- Co-extruded tracks fit to allow for easy removal and maintain low cross leakage.
- 68% to 70% with heat recovery modules at rated flow of 450 cfm.

Filtration (Supply and Exhaust)

- HRV450w – 1" [25 mm] reticulated foam washable filter 14" x 18" [356 x 457 mm] standard
- HRV1000w – 2" [51 mm] MEF disposable filter 16" x 20" [406 x 508 mm] standard

Electric Heating Option

- Open coil electric resistance elements
- Two stage operation
  - Stage one: 2.5 kW to 5.0 kW 208/230V, one-phase, 60 Hz
  - Stage two: 2.5 kW to 5.0 kW (HRV450w) 2.5 kW to 10.0 kW (HRV1000w) 208/230V, one-phase, 60 Hz

Hydronic Heating Option

- Aluminum hot water coil
- Single stage operation
  - 25,000 Btu coil (7.3 kW) – HRV450w
  - 50,000 Btu coil (14.6 kW) – HRV450w, HRV1000w
  - 70,000 Btu coil (20.5 kW) – HRV1000w

Installation

Rough In

The wallmount ventilators must be installed on a level base. Refer to Appendix A for dimensions. Zero clearance is required between the bottom of the unit and any combustible material.

Unit Installed without a Top Plenum

The supply air ducting must be connected to the supply collar and constructed so there are no openings within 30" [762 mm] of the electric heating elements. Openings within 30" [762 mm] of the elements must be fitted with a permanent, non-removable protective screening. Zero clearance is required between the supply duct and any combustible material.

Drainage – Heat Exchanger/Cooling Coil

Units equipped with air conditioning have a condensate line connected at the top of the unit which drains into the main condensate line. The heat exchanger and cooling coil drain must be fitted through the bottom of the case. Drain connections within the case are accessible by removing the bottom door. A length of PVC hose is supplied within the case to make the drain connection.

A water trap must be provided in the drain line to prevent back flow of sewer gases. This trap may be achieved by looping the drain line. The drain must be installed in an area in which it will not freeze. If the wallmount ventilator has a collector base, the drain hose will be located in the base.

Power

⚠ WARNING

Ensure the power disconnect switch is off before connecting power to the unit or working with high voltage lines.

A sealed strain relief clamp (supplied by the installer) must be fitted into the case to accommodate a power line connection (see Appendix A for knock out location). If a sealed clamp cannot be used, the hole must be sealed with silicone or an equivalent water/air-tight sealant. Power must be connected to the unit through a fused disconnect switch (to be supplied by the Installer). If the unit has a top supply plenum, a hole for the power must be field drilled in the plenum to accommodate the main power in.

Terminals for line connection are located in the control box within the wallmount ventilator and are labeled as shown below. Connections are illustrated in Appendix D.

Single-phase

A wiring diagram is supplied in Appendix D.

Table 1: Line Connection to 208 VAC or 230 VAC, Single-phase, 60 Hz for Electric Heat

L1	Hot	Black
L2	Hot	Red
N	Neutral	White
GND	Ground	Bare
L1	N	120 VAC 60 Hz
L2	L2	230 VAC 60 Hz or 208 VAC

Table 2: Line Connection to 120 VAC 60 Hz Required for Hydronic Heating

L1	Hot	Black
N	Neutral	White
GND	Ground	Bare
L1	N	120 VAC 60 Hz

Controls

External Switches

The wallmount ventilator controls (optional with Building Management System), are located on the left side panel. These controls consist of two rocker switches. The switches are labeled 'Ventilation Rate' and 'First Stage Heating'. The 'Ventilation Rate' switch sets the fan speeds to 'Low', 'Off', or 'High'. This switch is activated through terminal G and is also a system switch for an internal thermostat. The 'First Stage Heating' switch engages or disengages the function of the internal thermostat. On versions with hydronic heating, there will be no 'First Stage Heating' switch.

External Thermostat

Heating, cooling and ventilation can be controlled by a remote thermostat. The wiring configuration for the thermostat subbase is shown in Appendix E. Ventilation may otherwise be remote controlled by switching 'R' to 'FL' or 'FH'. A separate information package on the subbase is supplied with the wallmount ventilator.

The thermostat may be remote mounted on a nearby wall. If it is remote mounted, control wire leads must be fitted into the case through a sealed strain relief clamp where required. If a proper seal cannot be achieved with the clamp, use silicone or an equivalent water/air-tight sealant.

Control Box Low Voltage Connections

Building Management System connections will vary by application. All control connections to the external thermostat are 24 VAC 60 Hz.

Table 3: Control Box Low Voltage Connections

Wire Color	Connection and Description
Black	R – 24 VAC Hot
White	C – 24 VAC Common
Orange	W1 – Stage 1: Heating and signal for baseboard contactor (optional)
Red	W2 – Stage 2: Heating and recirc
Yellow	Y1 – Stage 1: Free cooling
	Y2 – Stage 2: Dx Cooling (optional)
Violet	S1 – Occupied mode
	S2 – N/A
	C1 – N/A
	FL – Fans low speed
Brown	FH – Fans high speed
Green	G – Fans auto (low)

Detailed control wiring is illustrated in Appendix D.

Internal Thermostat

An internal thermostat will engage Stage One when the supply air temperature falls below its setpoint. The function of this thermostat is disabled when the external heating switch is set to 'Off'. The operation of this thermostat is given in Appendix F. This thermostat is not available with the hydronic heating option or Building Management System option.

Building Management Systems

Control operation of the wallmount ventilator by a Building Management System is available by connecting to the terminals described above. For full control of the wallmount ventilator by the management system, external switches (if equipped) should be set to 'Off'. External switches set to 'On' will override the building management control. Each operation is activated by switching terminal 'R' to the corresponding terminal.

Airflow Balancing

Once installed, the wallmount ventilator must operate with balanced ventilation. Balanced ventilation is achieved by obtaining equal rates of supply and exhaust airflow. Airflow may be adjusted by balancing dampers (supplied by Installer) within the supply and exhaust ductwork.

Systems that are not operating with balanced airflow will not have effective energy recovery. Performance of the heat recovery module will be reduced and freezing may occur with cold outside air temperatures, resulting in blockage of the heat recovery module.

System Operation

Sequence of Operation

Electric Models

The operating sequence is summarized by the following:

Signal from:

- Internal Stat
  - Stage 1 heating
- Signal to W1
  - Stage 2 heating
  - Fans to low speed
  - Send signal to baseboard contactors (optional in field only)
- Signal to W2
  - Supply fan on
  - Exhaust fan off
  - Stage 1 heating
  - Close ventilation damper
- Signal to Y1
  - Supply fan to 'High' and exhaust fan 'Off' (free cooling)
- Signal to Y2
  - Air conditioning (optional)
  - Open recirc damper (HRV450w only)

  - Connection for condensing unit
- Signal to S1
  - Engage occupied mode
- No signal to S1
  - Engage unoccupied mode (fans off) and close vent damper. On a call for heat/cool the supply fan runs only in recirculation mode (with frost control option installed).

With the thermostat and sub-base, connect terminal G on the sub-base to the terminal 'G' in the control box. This will enable the ventilation to run on occupied cycles when the ventilation rate switch is on either 'High' or 'Low' and the T7350 fan operation shows 'On' in the lower right area of the display screen. When the fan operation shows 'Auto' only, a call for heat or cool will engage fan operation. Press the 'Fan' button on the T7350 to alternate between 'On' and 'Auto'. See Appendix E for the wiring details.

Hydronic Models

The operating sequence is summarized by the following:

Signal from:

- Signal to W1
  - Fans to low speed (duct stat to control zone valve)
- Signal to W2
  - Supply fan 'High'
  - Exhaust fan 'Off'
  - Close ventilation damper
- Signal to Y1
  - Free cooling mode
  - Supply fan on 'High' and exhaust fan 'Off'
- Signal to Y2
  - Air conditioning
  - Connection for condensing unit
- Signal to S1
  - Engage occupied mode
- No signal to S1
  - Engage unoccupied mode (fans off) and close vent damper (for units equipped with frost control). On a call for heat/cool the supply fan operates only.

Ventilation

Fan speed can be selected by setting the external ventilation rate switch to 'Low', 'Off', or 'High'. The fan operation on the T7350 must show 'On', in the lower right area of the display screen, for continuous ventilation. If you do not require ventilation, press the 'Fan' key to set the unit to 'Auto'. If ventilation is required, press the 'Fan' key to set the unit to 'On'. When the unit goes into the unoccupied mode, the ventilation will shut down even if the display shows the 'On' operation.

Heating

Electric

An internal thermostat acts as a supply air temperature monitor and engages heating as necessary to preheat supply air before delivering it to the space being ventilated. This thermostat comes with all electric heat models.

This thermostat is not available with hydronic heating. The thermostat contacts R and B make a closure on temperature fall which engages the heating contactor. The thermostat is factory set at 59°F [15°C] (actual 55°F [13°C] with differential set at two). For proper environment conditions, the temperature of the supply air diffused should be no lower than 55°F. This thermostat can be deactivated by turning the first stage heating switch to the 'Off' position. Further instructions for setting the thermostat are given in Appendix F.

If no heating is required at all, then the first stage heating switch should be in the 'Off' position and the T7350 should display either 'Off' or 'Cool'. During cooling season, the first stage heating switch should be in the 'Off' position.

Hydronic

Units equipped with hot water heating coils will come without controls for controlling flow, etc. Hot water piping connections are shown in Appendix A, Figure A2 and

Figure A4. Control valve is to be hooked up to a remote duct stat supplied by others (optional connection to 'W1' on the sub-base). All wiring is low voltage. This operation is single-stage and on a second stage call for heat the supply fan will go to high speed, the exhaust fan will shut off, and the unit will go into recirc mode. See Appendix A, Figure A2 and Figure A4 for more details.

High Temperature Limit Control

IMPORTANT

Electric models only.

Temperature limit thermostats in the heating circuit will break contact to the heating elements when the temperature rise across the heating elements becomes excessive. This may be due to blocked filters, blocked energy recovery module, blocked ducting, fan failure or fan relay failure. See the System Service section for proper equipment maintenance.

First Stage Cooling

First stage cooling puts the supply fan to high speed and the exhaust fan shuts off.

Second Stage Cooling – Air Conditioning

Second stage cooling is an option and will call for Dx cooling from a remote condensing unit. Both fans will run on high speed.

Air conditioning is provided as an option. A field connection from 'Y2' on the terminal block (inside control box) must be run to the contactor in the remote condensing unit. This line will be 24 VAC hot. If a return line is also required for the contactor, it can be taken from terminal 'C'. See wiring diagram in control box for further details. Suction and liquid line connections are made at the coil (equipped with solder connects).

Holes in the top supply plenum are to be field drilled to accommodate the refrigerant lines. On a call for cooling, both fans will go to high speed and the recirc damper on the right side of the unit will open to allow for increased airflow over the coil.

⚠ WARNING

To prevent poor performance for air conditioning allow 4" to 6" [102 to 152 mm] from the right side to any wall or partition.

Air Conditioning Coil Installation

Place the provided insulation on top of the unit over the matching supply opening. Place the coil and drain pan assembly over the insulation and supply air opening. Place clips in opposing corners of coil drain pan and fasten down to the top of unit with screws. Leave enough clearance around the back and side edges of the unit to allow installation of the top supply discharge plenum or ducting as required.

See Appendix A, Figure A2 and Figure A4 for installing the air conditioning coil on top of the wallmount ventilator.

Recirculation Control

In the HRV450w ventilation mode, the ventilation damper is open and the supply air is 100% outdoor air. In the HRV1000w ventilation mode, the ventilation damper is open and the supply air is a mixture with a percentage of return air (see Table B2 or Table B3).

In recirculation mode, the ventilation damper is closed, 100% of the supply air is recirculated air from the return plenum. Units equipped with recirculation control are built with a damper mechanism controlling airflow through the intake duct. Ventilation mode is activated by a signal to terminal S1. Recirculation mode is activated when there is a signal from W2 or when there is no signal to S1.

Frost Control

Units with frost control are equipped with recirculation control. Frost control consists of a timer/controller which is activated by a thermostat which monitors the outside air temperature passing through the air intake.

When the HRV450w and HRV1000w are in ventilation mode at temperatures below 23°F [–5°C], the frost control timer/controller activates recirculation control periodically to keep the flat plate heat exchanger free from frost.

Freeze Control Temperature Disc

A bi-metallic disc (field installed) is provided with hydronic units to prevent the coils from freezing up. This disc is located near the supply fan and is to be connected to the zone valve that controls the flow to the coil. When the temperature in the cabinet goes below freezing, the disc closes its contacts to engage the flow through the coil to prevent the coil from freezing. See the wiring diagram on unit control box cover for more details.

System Service

Monthly Maintenance

⚠ WARNING

Disconnect power before maintaining the unit.

Air Filters

HRV450w

The washable black foam filters should be cleaned monthly or as required by operating conditions. The optional medium efficiency filters are disposable and should be replaced monthly or as required by operating conditions. To remove the filters, simply remove the top access door and slide the filter out of the guide (see Figure 1). When installing a new filter, the airflow arrow should point in the direction of the heat exchanger.

Figure 1: HRV450w exhaust filter

HRV1000w

The standard medium efficiency filters are disposable and should be replaced monthly or as required by operating conditions. When installing a new filter, the airflow arrow should point in the direction of the heat exchanger.

To remove the HRV1000w filters, simply remove the bottom access door and slide the filter out of the guide.

⚠ WARNING
Disconnect power before maintaining the unit.

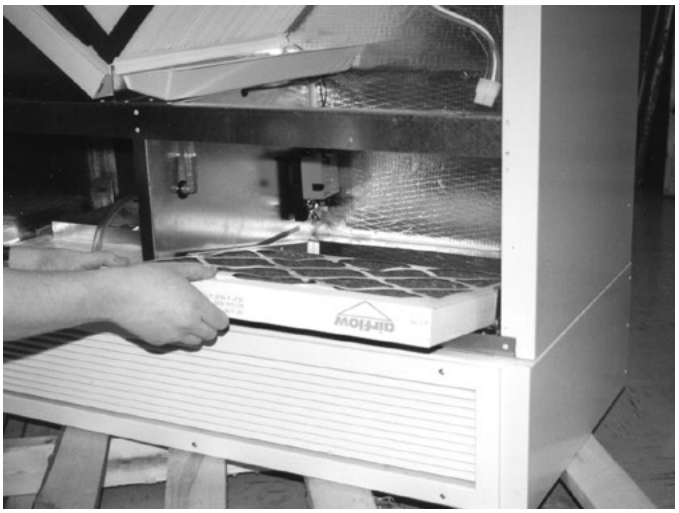


Figure 2: HRV1000w exhaust filter

Figure 3: HRV1000w exhaust filter

Annual Maintenance

Drain Pans and Interior of Unit

The inside of the unit, including drain pans (if equipped), should be wiped clean annually with a soft cloth and mild cleaning solution. Check the drain fittings (if equipped) to ensure they are draining freely.

Plate Heat Exchanger

Clean the heat recovery module by removing it from the unit and washing out the spaces between the plates using a mild detergent. If a high pressure hose is used, avoid causing damage to the exchanger by making sure that the nozzle does not get too close to it.

Heaters/Air Conditioning Coils

Check the duct heaters, hot water coils and air conditioning coils for obstruction or build-up of dust. Check the manual reset button on your duct heaters (if unit has electric heat). If the red buttons are released out, depress the red button to reset the switch. If this problem persists, call your local technician.

Dampers

Check inside dampers for obstruction and cleanliness.

Fans

Blower wheels and fan housings should be checked for dust build-up. If excessive dust build-up exists, it will be necessary to remove the blower assembly to clean the dust out through the fan mouth.

To remove the supply blower, first remove the two screws holding the blower in place, disconnect the electrical plug and slide the blower out of the unit.

To remove the exhaust blower, the control box has to be removed. Disconnect the electrical plugs from the control box and remove the four screws holding it in place to expose the exhaust blower. Remove the two wing screws and slide the exhaust blower out.

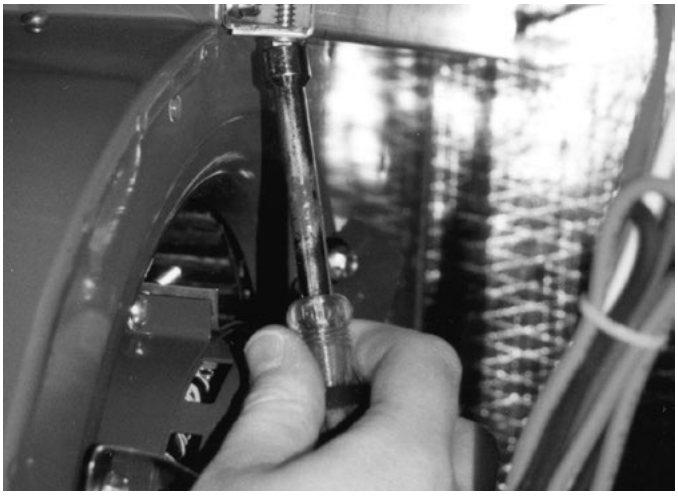


Figure 4: Remove wing screws on supply blower

⚠ WARNING

Disconnect power before maintaining the unit.

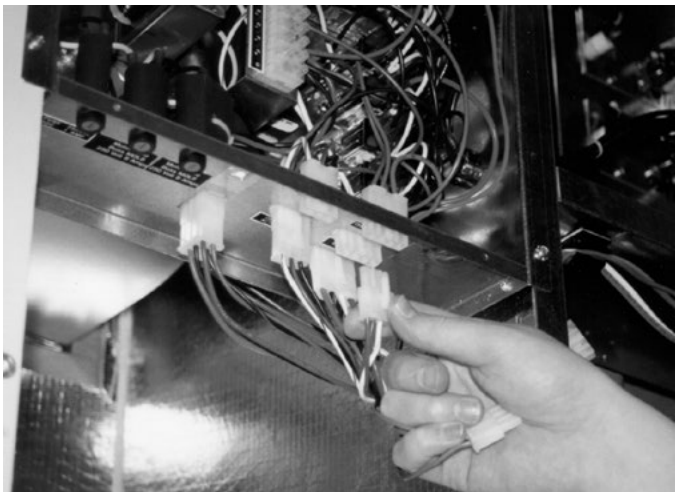


Figure 5: Disconnect electrical plugs

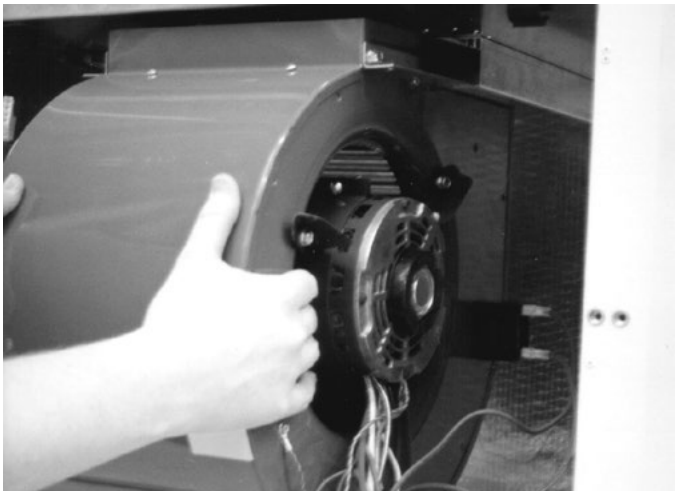


Figure 6: Remove supply blower

Appendix A: Unit Dimensions

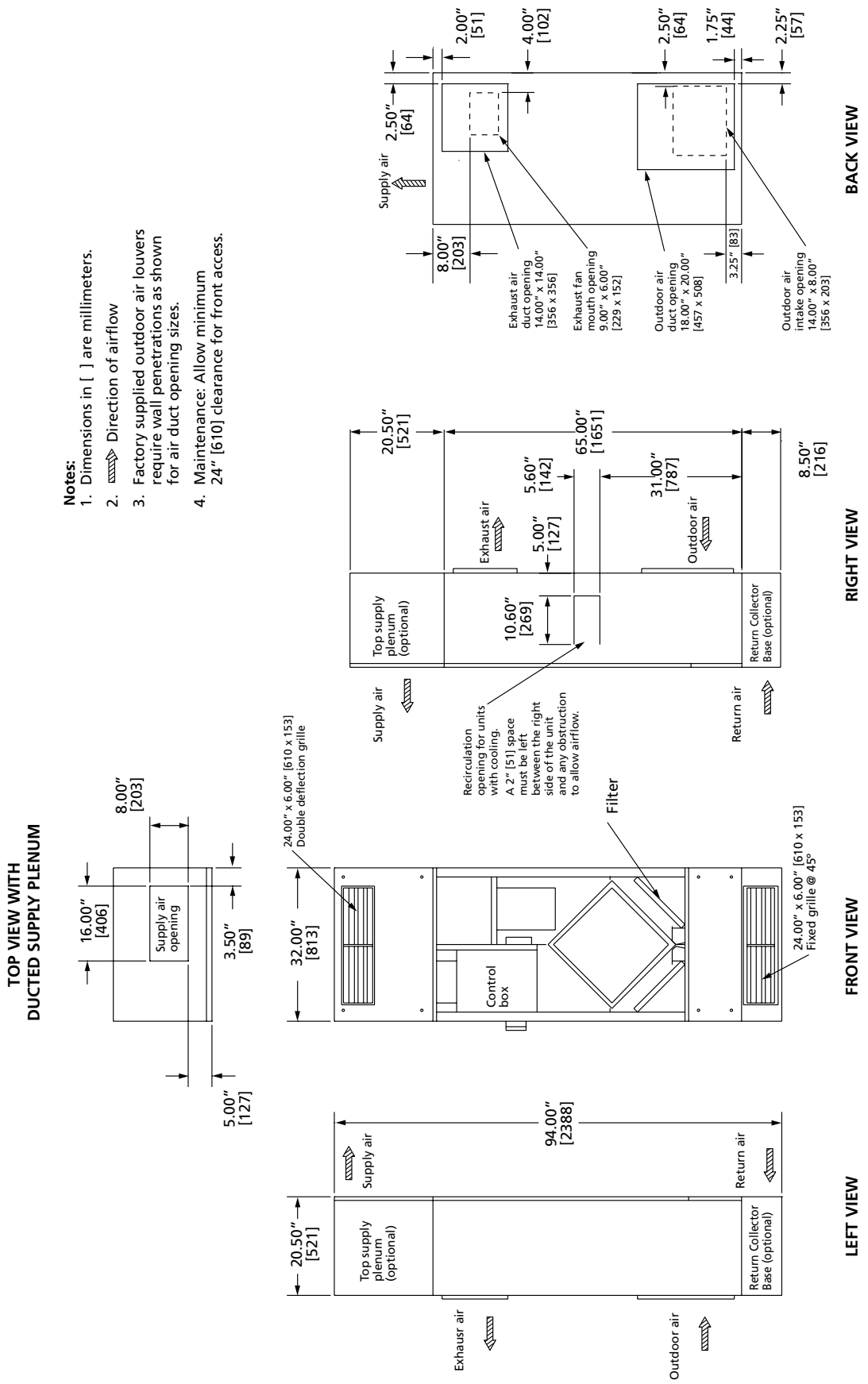

Notes:
1. Dimensions in [ ] are millimeters.
2. Direction of airflow
3. Factory supplied outdoor air louvers require wall penetrations as shown for air duct opening sizes.
4. Maintenance: Allow minimum 24" [610] clearance for front access.
TOP VIEW WITH DUCTED SUPPLY PLENUM
8.00" [203]
16.00" [406]
Supply air opening
3.50" [89]
5.00" [127]
24.00" x 6.00" [610 x 153] Double deflection grille
32.00" [813]
Control box
Filter
24.00" x 6.00" [610 x 153] Fixed grille @ 45°
FRONT VIEW
20.50" [521]
Top supply plenum (optional)
Supply air
Return air
Return Collector Base (optional)
94.00" [2388]
Exhausr air
Outdoor air
LEFT VIEW
Recirculation opening for units with cooling. A 2" [51] space must be left between the right side of the unit and any obstruction to allow airflow.
20.50" [521]
Exhaust air
5.60" [142]
5.00" [127]
10.60" [269]
65.00" [1651]
31.00" [787]
Outdoor air
8.50" [216]
RIGHT VIEW
2.00" [51]
4.00" [102]
2.50" [64]
1.75" [44]
2.25" [57]
Supply air
2.50" [64]
8.00" [203]
Exhaust air duct opening 14.00" x 14.00" [356 x 356]
Exhaust fan mouth opening 9.00" x 6.00" [229 x 152]
Outdoor air duct opening 18.00" x 20.00" [457 x 508]
3.25" [83]
Outdoor air intake opening 14.00" x 8.00" [356 x 203]
BACK VIEW

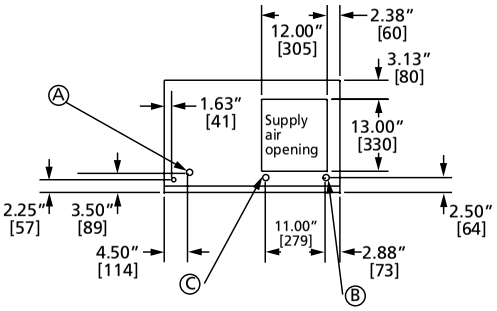
Figure A1: HRV450w unit dimensions

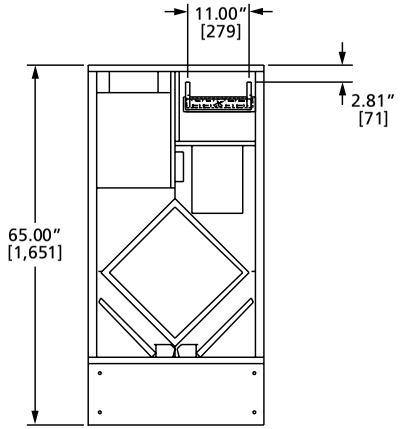
Figure A2: HRV450w coil dimensions

25/50 MBTU HYDRONIC

Connection Table		
		Connection sizes
Ⓐ	Field power supply outlet	1 1/8″
Ⓑ	Coil connection	7/8″ (sweat)
Ⓒ	Coil connection	7/8″ (sweat)

TOP VIEW WITHOUT SUPPLY PLENUM





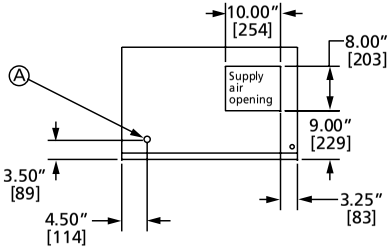
FRONT VIEW

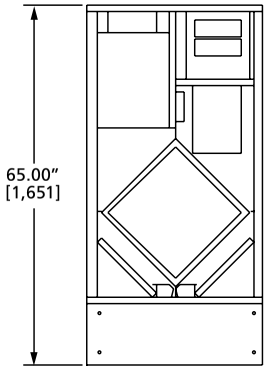
Note:
Dimensions in [ ] are millimeters.

ELECTRIC HEAT

Connection Table		
		Connection Sizes
Ⓐ	Field power supply outlet	1 1/8″

TOP VIEW WITHOUT SUPPLY PLENUM



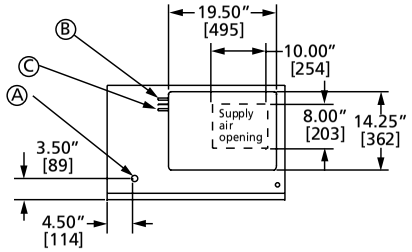


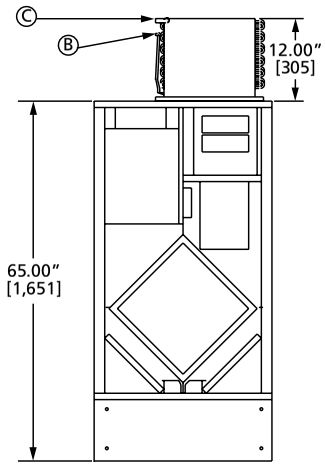
FRONT VIEW

DX COOLING

Connection Table		
		Connection Sizes
Ⓐ	Field power supply outlet	1 1/8″
Ⓑ	Supply	3/8″ (sweat)
Ⓒ	Suction	3/4″ (sweat)

TOP VIEW WITHOUT SUPPLY PLENUM



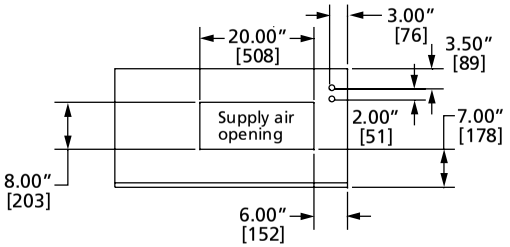


FRONT VIEW

Note:
Drain for condensate for cooling coil will have to be installed out the bottom of the unit.

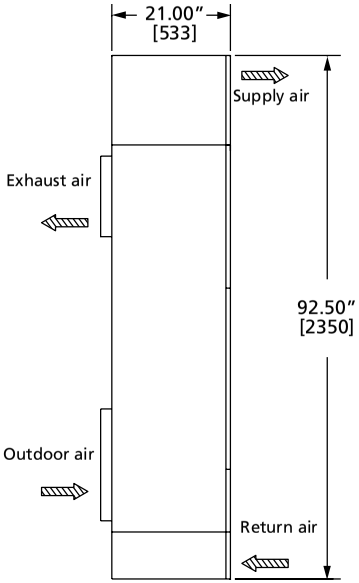
Figure A3: HRV1000w unit dimensions

TOP VIEW WITH DUCTED SUPPLY PLENUM

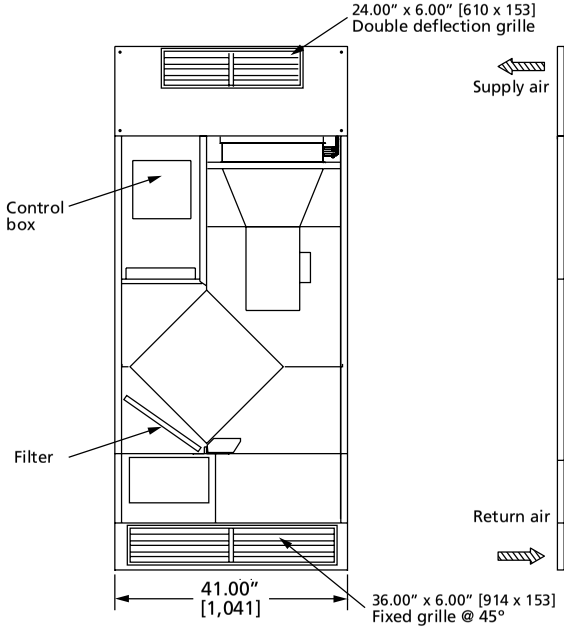


Notes:

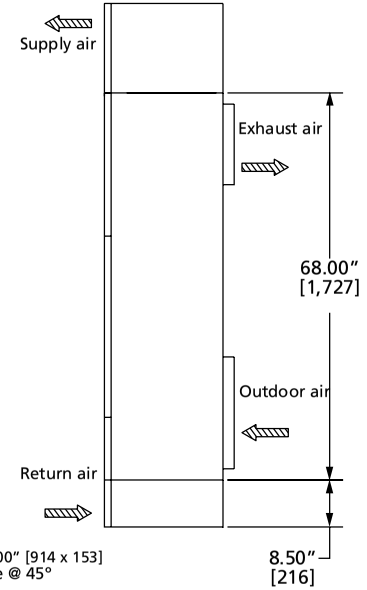
1. Dimensions in [ ] are millimeters.
2. ⇨ Direction of airflow
3. Factory supplied outdoor air louvers require wall penetrations as shown for air duct opening sizes.
4. Maintenance: Allow minimum 24″ [610] clearance for front access.



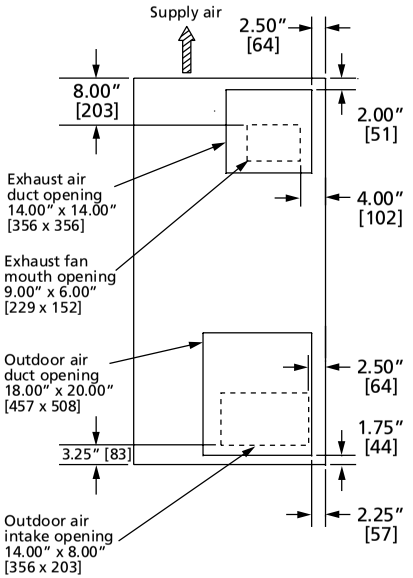
LEFT VIEW



FRONT VIEW



RIGHT VIEW



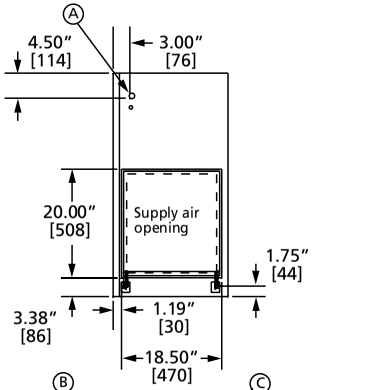
BACK VIEW

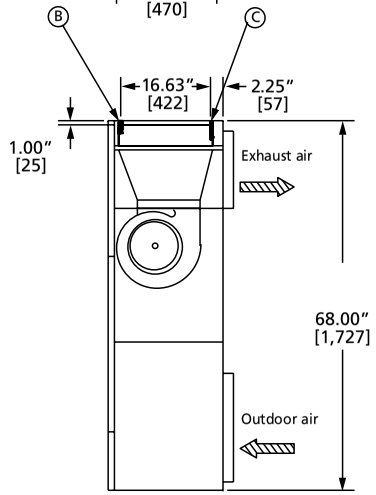
Figure A4: HRV1000w coil dimensions

HYDRONIC HEAT

Connection Table		
		Connection Sizes
Ⓐ	Field power supply outlet	1¼"
Ⓑ	Coil connection	½" (sweat)
Ⓒ	Coil connection	½" (sweat)

TOP VIEW WITHOUT SUPPLY PLENUM





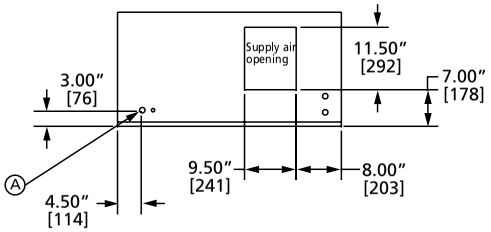
RIGHT VIEW

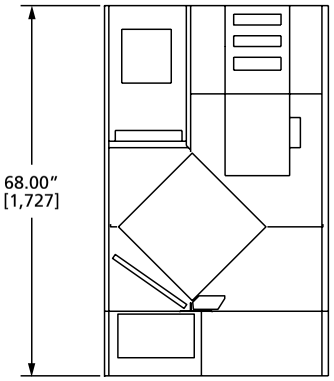
Note:
Dimensions in [ ] are millimeters.

ELECTRIC HEAT

Connection Table		
		Connection Sizes
Ⓐ	Field power supply outlet	1¼"

TOP VIEW WITHOUT SUPPLY PLENUM



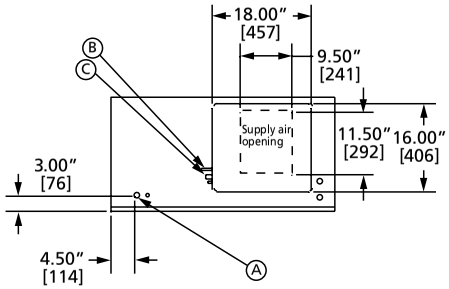


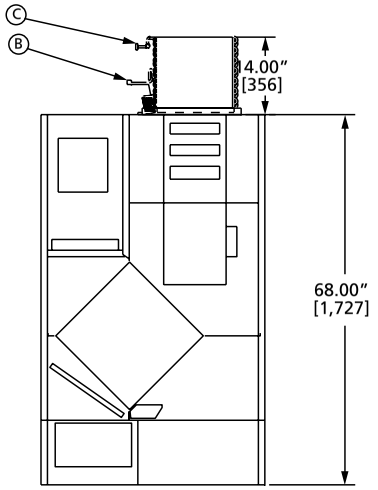
FRONT VIEW

DX COOLING

Connection Table		
		Connection Sizes
Ⓐ	Field power supply outlet	1¼"
Ⓑ	Supply	3/8" (sweat)
Ⓒ	Suction	3/4" (sweat)

TOP VIEW WITHOUT SUPPLY PLENUM





FRONT VIEW

Note:
Drain for condensate for cooling coil will have to be installed out the bottom of the unit.

Appendix B: Ventilation and Airflow Information

Table B1: HRV450w Ventilation

ESP (in. w.g.)	Polypropylene Core Low Speed	Polypropylene Core High Speed	Aluminum Core Low Speed	Aluminum Core High Speed	Recirc. Open for Dx Cooling
0.00	460	685	460	710	800
0.10	435	630	445	665	750
0.15	415	600	435	640	725
0.20	400	580	425	605	705
0.25	380	550	410	585	675
0.30	365	510	390	555	645
0.35	340	480	375	540	605
0.40	305	435	355	495	570
0.45	280	410	335	460	530
0.50	250	375	295	430	495
0.55	220	335	265	395	460
0.60	190	N/A	235	340	415

External static pressure is calculated by totalling the individual air pressure drops for the following options: electric heat, hot water heat, evaporator cooling coil, top supply plenum and louvers.

Table B2: HRV1000w Reduced Low Speed Airflow Information

		Position of Recirc Panel									
		Fully Closed	1		2		3		4		Fully Open	
Supply Fan	ESP (in. w.g.)	TA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)
Speed 1	0.00	920	1,150	890	1,270	860	1,360	855	1,400	685	1,430	650
	0.10	885	1,095	870	1,215	830	1,300	815	1,345	665	1,360	635
	0.20	830	1,050	835	1,160	810	1,245	795	1,270	645	1,300	625
	0.30	790	985	805	1,120	780	1,190	755	1,205	625	1,245	610
	0.40	725	935	770	1,060	750	1,135	735	1,150	615	1,180	590
	0.50	685	885	740	995	710	1,075	710	1,080	595	1,095	575
	0.60	610	810	690	945	675	1,015	665	1,000	575	1,020	550
	0.70	545	745	640	855	635	915	635	900	545	920	520
	0.80	455	670	600	775	600	820	590	790	505	810	485
	0.90	—	545	540	645	540	715	540	660	465	675	450
	1.00	—	—	—	—	—	555	475	490	415	490	390
Speed 2	0.00	870	1,020	810	—	—	—	—	—	—	—	—
	0.10	835	970	785	1,075	745	1,090	705	1,095	570	1,110	565
	0.20	775	935	765	1,025	730	1,060	690	1,065	565	1,065	555
	0.30	735	885	735	980	700	1,030	675	1,020	550	1,035	550
	0.40	685	845	710	930	670	980	655	970	540	970	535
	0.50	625	805	685	895	650	930	630	920	530	940	530
	0.60	575	735	640	845	625	880	610	860	510	900	515
	0.70	505	670	600	765	595	815	580	785	485	830	490
	0.80	405	585	555	680	555	725	545	670	445	730	450
	0.90	—	—	—	550	490	605	490	545	405	600	420

Additional internal static pressure due to accessories must be known to determine ESP.
This data includes factory selected louver and electric heat coils.
OA balancing damper may be required to achieve desired ventilation air volume.
Exhaust fan is set to low speed for shaded cells.

Table B2: HRV1000w Reduced Low Speed Airflow Information

		Position of Recirc Panel										
		Fully Closed	1		2		3		4		Fully Open	
Supply Fan	ESP (in. w.g.)	TA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)
Speed 3	0.00	—	—	—	—	—	—	—	—	—	—	—
	0.10	765	815	680	—	—	—	—	—	—	—	—
	0.20	715	795	670	845	615	865	595	860	495	865	485
	0.30	660	765	650	835	610	845	585	815	490	845	475
	0.40	610	735	630	785	600	805	570	795	485	810	470
	0.50	575	705	615	765	585	785	565	745	465	780	465
	0.60	520	650	595	710	550	735	535	695	450	730	450
	0.70	420	585	555	655	540	670	510	625	430	660	435
	0.80	365	505	510	565	495	580	475	545	415	560	405
	0.90	—	—	—	—	—	460	420	385	355	455	375
Speed 4	0.00	—	—	—	—	—	—	—	—	—	—	—
	0.10	650	—	—	—	—	—	—	—	—	—	—
	0.20	610	—	—	—	—	—	—	—	—	—	—
	0.30	575	635	570	665	530	670	510	660	435	650	420
	0.40	540	610	565	655	520	655	505	635	430	640	415
	0.50	485	585	555	630	515	620	490	610	420	615	415
	0.60	430	545	530	580	505	595	475	585	415	575	405
	0.70	365	490	490	525	470	540	455	520	395	505	390
	0.80	—	—	—	405	415	460	420	420	365	405	365

Additional internal static pressure due to accessories must be known to determine ESP.
This data includes factory selected louver and electric heat coils.
OA balancing damper may be required to achieve desired ventilation air volume.
Exhaust fan is set to low speed for shaded cells.

Table B3: HRV1000w High Speed and Regular Low Speed Airflow Information

		Position of Recirc Panel										
		Fully Closed	1		2		3		4		Fully Open	
Supply Fan	ESP (in. w.g.)	TA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)	TA (CFM)	OA (CFM)
Speed 1	0.00	1,000	1,230	875	1,355	855	1,470	825	1,560	805	1,605	790
	0.10	950	1,180	835	1,305	835	1,415	795	1,510	785	1,540	770
	0.20	895	1,105	815	1,240	805	1,355	775	1,445	760	1,465	740
	0.30	840	1,045	795	1,190	770	1,295	750	1,360	725	1,395	710
	0.40	780	980	755	1,135	740	1,215	710	1,290	700	1,315	680
	0.50	715	915	710	1,060	710	1,145	690	1,225	680	1,235	655
	0.60	645	840	665	995	675	1,075	655	1,140	640	1,170	635
	0.70	565	745	620	910	635	980	620	1,055	610	1,070	600
	0.80	445	660	565	805	590	875	575	940	580	975	570
	0.90	—	—	—	680	535	765	540	780	515	835	520
	1.00	—	—	—	—	—	—	—	—	—	—	—

Additional internal static pressure due to accessories must be known to determine ESP.
This data includes factory selected louver and electric heat coils.
OA balancing damper may be required to achieve desired ventilation air volume.
Exhaust fan is set to low speed for shaded cells.

Table B3: HRV1000w High Speed and Regular Low Speed Airflow Information

		Position of Recirc Panel										
		Fully Closed	1		2		3		4		Fully Open	
Supply Fan	**ESP (in. w.g.)**	**TA (CFM)**	**TA (CFM)**	**OA (CFM)**	**TA (CFM)**	**OA (CFM)**	**TA (CFM)**	**OA (CFM)**	**TA (CFM)**	**OA (CFM)**	**TA (CFM)**	**OA (CFM)**
Speed 2	0.00	1,000	1,190	855	1,305	820	1,390	790	1,455	760	1,500	745
	0.10	940	1,135	815	1,255	795	1,330	770	1,410	740	1,445	720
	0.20	880	1,090	805	1,190	770	1,270	740	1,350	420	1,375	705
	0.30	815	1,030	770	1,135	745	1,215	715	1,290	700	1,300	680
	0.40	755	965	740	1,075	710	1,145	685	1,210	660	1,235	655
	0.50	680	895	690	1,010	680	1,090	665	1,130	640	1,170	635
	0.60	620	825	645	945	645	1,010	640	1,070	610	1,085	610
	0.70	525	735	600	850	600	925	595	960	575	990	575
	0.80	—	630	545	765	575	835	565	865	550	885	550
	0.90	—	—	—	630	510	700	510	710	490	740	495
Speed 3	0.00	960	1,120	820	1,200	775	1,280	745	1,300	695	1,325	675
	0.10	910	1,075	795	1,145	745	1,230	715	1,250	670	1,290	660
	0.20	845	1,030	770	1,105	720	1,175	700	1,210	655	1,235	650
	0.30	785	965	730	1,060	705	1,130	670	1,155	640	1,185	640
	0.40	725	915	700	995	670	1,075	650	1,100	620	1,130	625
	0.50	670	840	670	945	635	995	615	1,040	600	1,055	595
	0.60	595	775	625	875	605	925	595	960	575	990	575
	0.70	495	690	575	785	580	850	555	865	550	895	550
	0.80	390	580	505	680	540	745	520	780	515	800	515
	0.90	—	—	—	—	—	605	465	640	470	740	450
Speed 4	0.00	910	1,025	745	1,075	690	1,090	655	1,070	620	—	—
	0.10	865	985	730	1,010	670	1,075	640	1,055	610	1,070	595
	0.20	805	935	700	980	655	1,040	625	1,005	600	1,055	590
	0.30	745	880	675	945	640	1,025	615	960	580	1,025	580
	0.40	680	825	645	850	595	960	600	905	555	975	565
	0.50	620	765	610	805	585	910	575	855	540	925	550
	0.60	550	705	590	775	575	840	550	780	515	865	540
	0.70	440	620	490	700	540	765	530	675	475	790	515
	0.80	—	—	—	605	410	655	475	—	—	685	470

Additional internal static pressure due to accessories must be known to determine ESP.
This data includes factory selected louver and electric heat coils.
OA balancing damper may be required to achieve desired ventilation air volume.
Exhaust fan is set to low speed for shaded cells.

Appendix C: Electrical Data

Table C1: 208 VAC HRV450w Electric Heat

Amount of Heat	MCA	MOP	BTU/hr	AC Option			
				1½ Ton		2 Ton	
				kW	BTU/hr	kW	BTU/hr
2.5 kW	20.6	25	8,533	5.3	18,000	7.0	24,000
5.0 kW	35.6	40	17,065	5.3	18,000	7.0	24,000
7.5 kW	50.8	60	25,598	5.3	18,000	7.0	24,000
10.0 kW	65.8	70	34,130	5.3	18,000	7.0	24,000

Table C2: 230 VAC HRV450w Electric Heat

Amount of Heat	MCA	MOP	BTU/hr	AC Option			
				1½ Ton		2 Ton	
				kW	BTU/hr	kW	BTU/hr
2.5 kW	19.3	20	8,533	5.3	18,000	7.0	24,000
5.0 kW	32.8	35	17,065	5.3	18,000	7.0	24,000
7.5 kW	46.4	50	25,598	5.3	18,000	7.0	24,000
10.0 kW	60.0	60	34,130	5.3	18,000	7.0	24,000

Table C3: 120 VAC HRV450w Hydronic Heat

Amount of Heat	MCA	MOP	kW	BTU/hr	AC Option			
					1½ Ton		2 Ton	
					kW	BTU/hr	kW	BTU/hr
No heat	5.6	9	0.0	0	5.3	18,000	7.0	24,000
25 MBH H_2O coil	5.6	9	6.7	23,000	5.3	18,000	7.0	24,000
50 MBH H_2O coil	5.6	9	10.8	37,000	5.3	18,000	7.0	24,000

Table C4: 208 VAC HRV1000w Electric Heat

Amount of Heat	MCA	MOP	BTU/hr	AC Option – 3 Ton	
				kW	BTU/hr
2.5 kW	22.8	25	8,533	10.5	36,000
5.0 kW	37.8	40	17,065	10.5	36,000
7.5 kW	52.9	60	25,598	10.5	36,000
10.0 kW	67.9	70	34,130	10.5	36,000
12.5 kW	82.9	90	42,663	10.5	36,000
15.0 kW	97.9	100	51,195	10.5	36,000

Table C5: 230 VAC HRV1000w Electric Heat

Amount of Heat	MCA	MOP	BTU/hr	AC Option – 3 Ton	
				kW	BTU/hr
2.5 kW	21.4	25	8,533	10.5	36,000
5.0 kW	34.9	35	17,065	10.5	36,000
7.5 kW	48.5	50	25,598	10.5	36,000
10.0 kW	62.1	70	34,130	10.5	36,000
12.5 kW	75.6	80	42,663	10.5	36,000
15.0 kW	89.3	90	51,195	10.5	36,000

Table C6: 120 VAC HRV1000w Hydronic Heat

Amount of Heat	MCA	MOP	kW	BTU/hr	AC Option – 3 Ton	
					kW	BTU/hr
No heat	12.1	15	0.0	0	5.3	18,000
50 MBH H_2O coil	12.1	15	14.6	50,000	5.3	18,000
70 MBH H_2O coil	12.1	15	20.5	70,000	5.3	18,000

Appendix D: Low Voltage and High Voltage Wiring

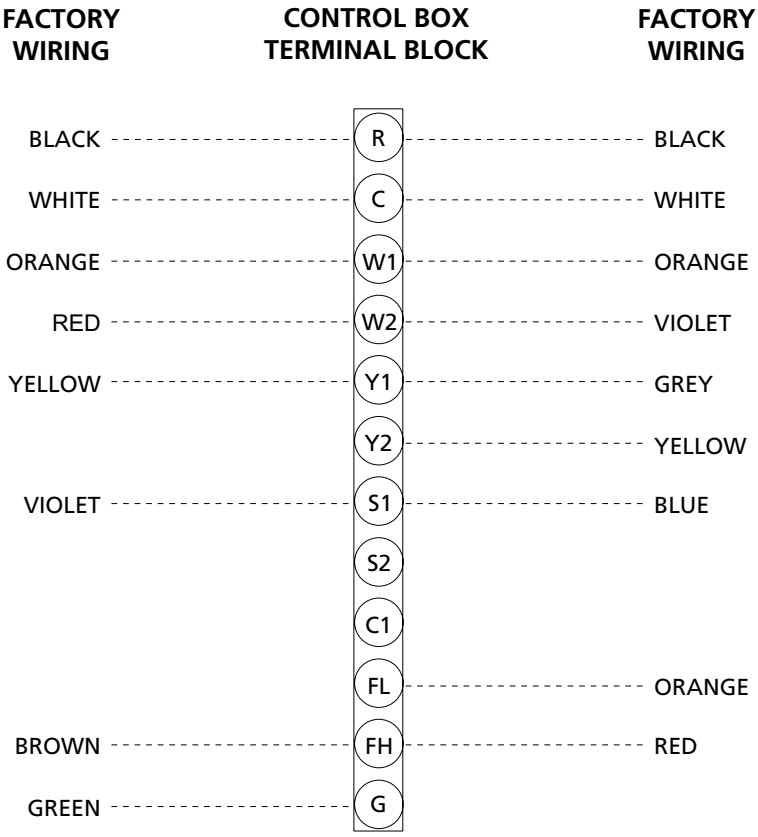
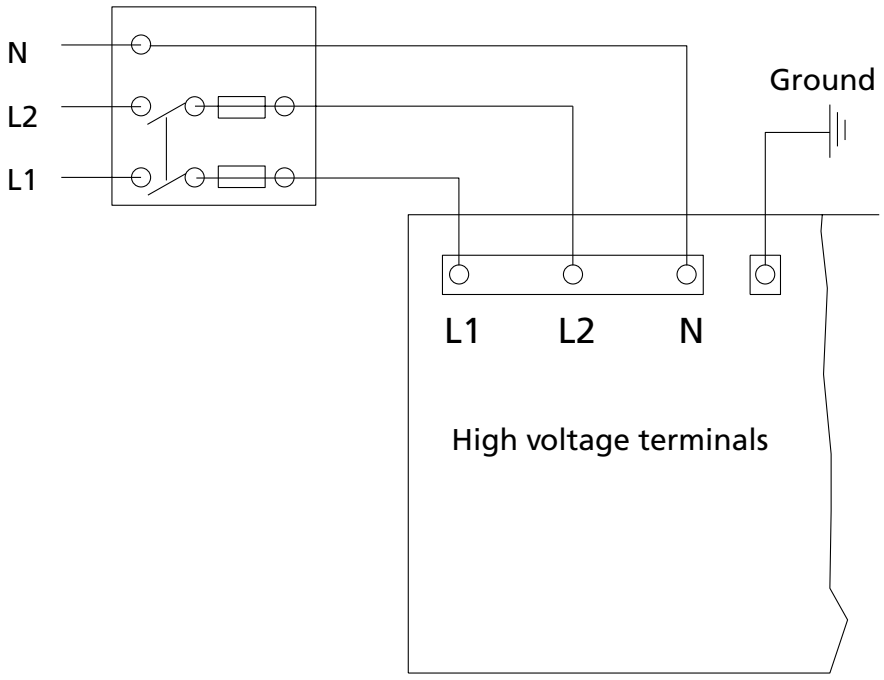


Figure D1: Connections to terminal block in control box



Notes:

1. Fused disconnect switch supplied by Installer.
2. 208–230 VAC/120/1/60 requires a neutral wire to be run with L1 and L2.
3. For 120/1/60 volt units, L2 is not required.

Figure D2: Single-phase power supply wiring

Appendix E: Thermostat and Wiring Connections

Thermostat Sub-base Setup

Factory supplied thermostats and sub-bases are configured and ready for installation. Use this information to configure thermostats that are field supplied.

Install jumper wires across the following terminals; refer to Figure E1.

Jumper Connections – Sub-base

- 1 – 'RH' to 'RC' (factory installed)
- Connections 'R', 'C' , 'W', etc. to ventilation unit are as shown.

Thermostat Setup

See the manufacturer's instruction manual for detailed instructions on how to program the following thermostat functions that must be set:

1. Day of the week
2. Time
3. Daily schedules
4. System (heat, cool, automatic)
5. Fan (on, auto)

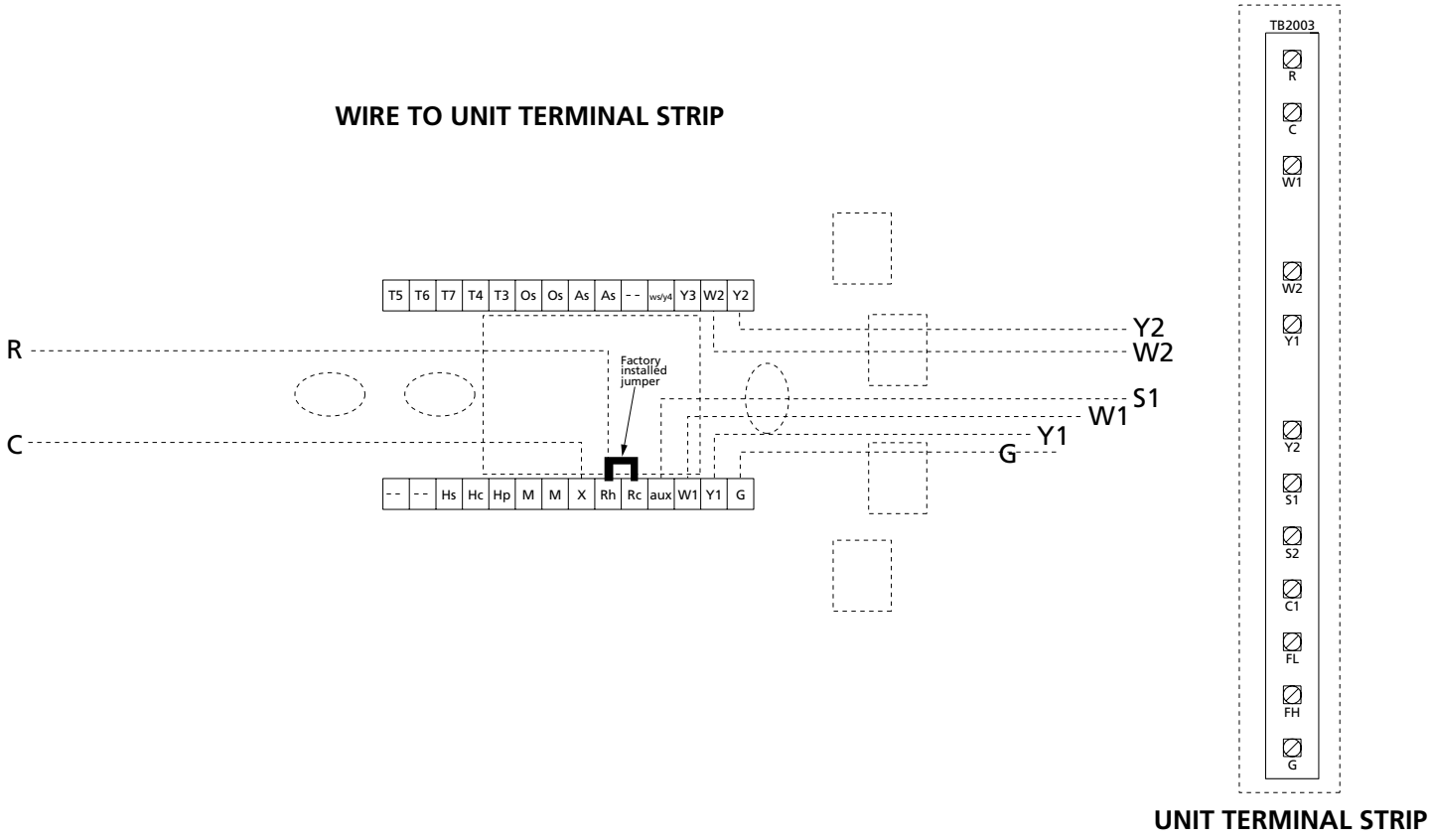


Figure E1: Thermostat sub-base setup

Appendix F: Internal Thermostat

T675A

As the temperature of the controlled medium falls below the setpoint less differential, the T675A switch makes terminals R to B and energizes a normally closed solenoid valve to provide heat. In cooling applications, the T675A makes terminals R to W as the temperature rises above the set point, energizing cooling equipment. Figure F1 shows the operation of the T675A. Figure F2 shows the location of the adjustment dial on models with an adjustable differential.

Freeze-up Protection

When using the T675A (auto recycling) for freeze-up protection, the recommended setpoint is 38°F [3.3°C] plus the switch differential.

Example

Setpoint of 38°F [3.3°C] plus 1°F [0.6°C] (fixed differential model) equals an actual setpoint of 39°F [3.9°C].

Example

Setpoint of 38°F [3.3°C] plus 3°F [1.7°C] (adjustable differential model) equals an actual setpoint of 41°F [5°C].

This provides an adequate safety factor for freeze-up protection.

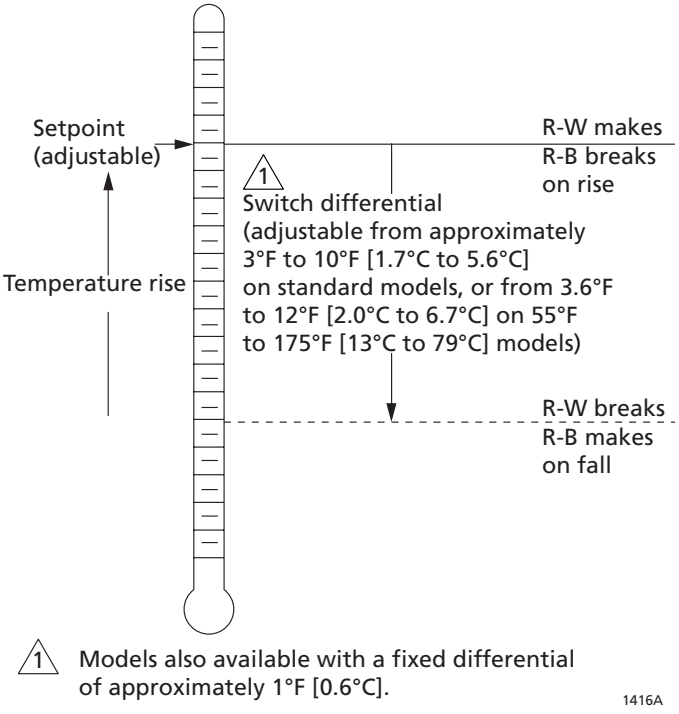


Figure F1: T675A operation

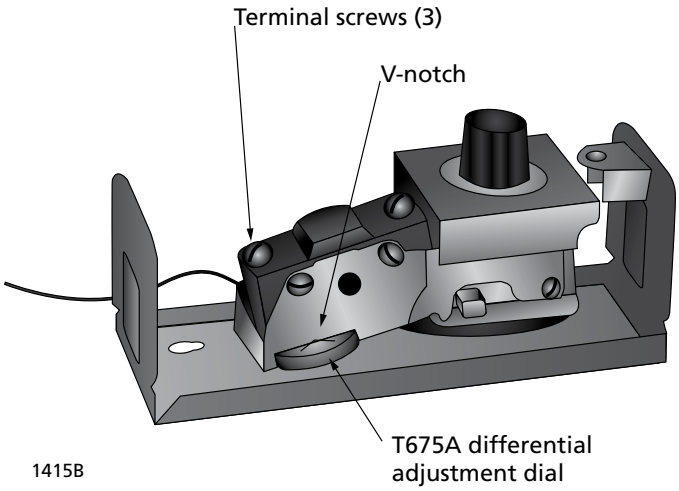


Figure F2: Adjustment dial location on T675A models with an adjustable differential

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